National Institute of Environmental Health Sciences

Spatial variation of crop yield response to climate change in East Africa

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Abstract:

There is general consensus that the impacts of climate change on agriculture will add significantly to the development challenges of ensuring food security and reducing poverty, particularly in Africa. While these changes will influence agriculture at a broad scale, regional or country-level assessments can miss critical detail. We use high-resolution methods to generate characteristic daily weather data for a combination of different future emission scenarios and climate models to drive detailed simulation models of the maize and bean crops. For the East African region, there is considerable spatial and temporal variation in this crop response. We evaluate the response of maize and beans to a changing climate, as a prelude to detailed targeting of options that can help smallholder households adapt. The results argue strongly against the idea of large, spatially contiguous development domains for identifying and implementing adaptation options, particularly in regions with large variations in topography and current average temperatures. Rather, they underline the importance of localised, community-based efforts to increase local adaptive capacity, take advantage of changes that may lead to increased crop and livestock productivity where this is possible, and to buffer the situations where increased stresses are likely.

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Resource Description

Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES), Other Climate Scenario

Special Report on Emissions Scenarios (SRES) Scenario: SRES A1, SRES A2, SRES B1, SRES B2

Other Climate Scenario: A1FI

Exposure :

weather or climate related pathway by which climate change affects health

Food/Water Security

Food/Water Security: Agricultural Productivity, Livestock Productivity

Geographic Feature:

resource focuses on specific type of geography

Tropical

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Africa

African Region/Country: African Region

Other African Region: East Africa

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Mitigation/Adaptation: ☑

mitigation or adaptation strategy is a focus of resource

Adaptation

Model/Methodology: ☑

type of model used or methodology development is a focus of resource

Exposure Change Prediction

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Low Socioeconomic Status, Workers

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Long-Term (>50 years)

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content